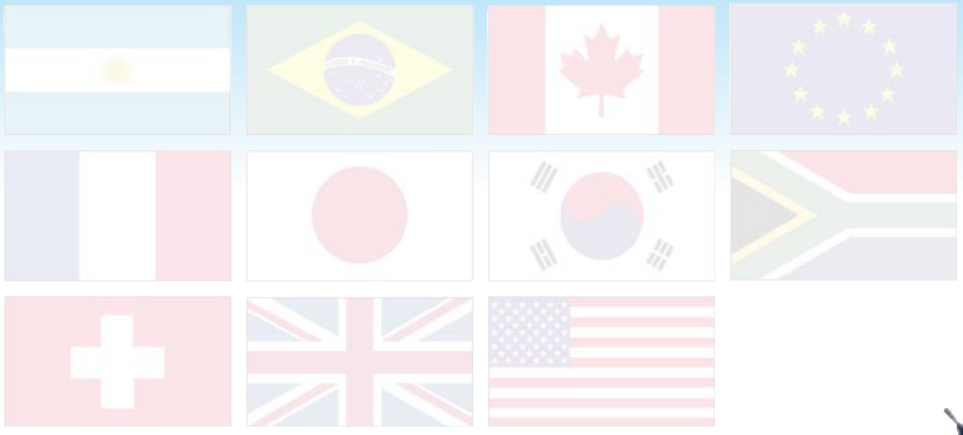

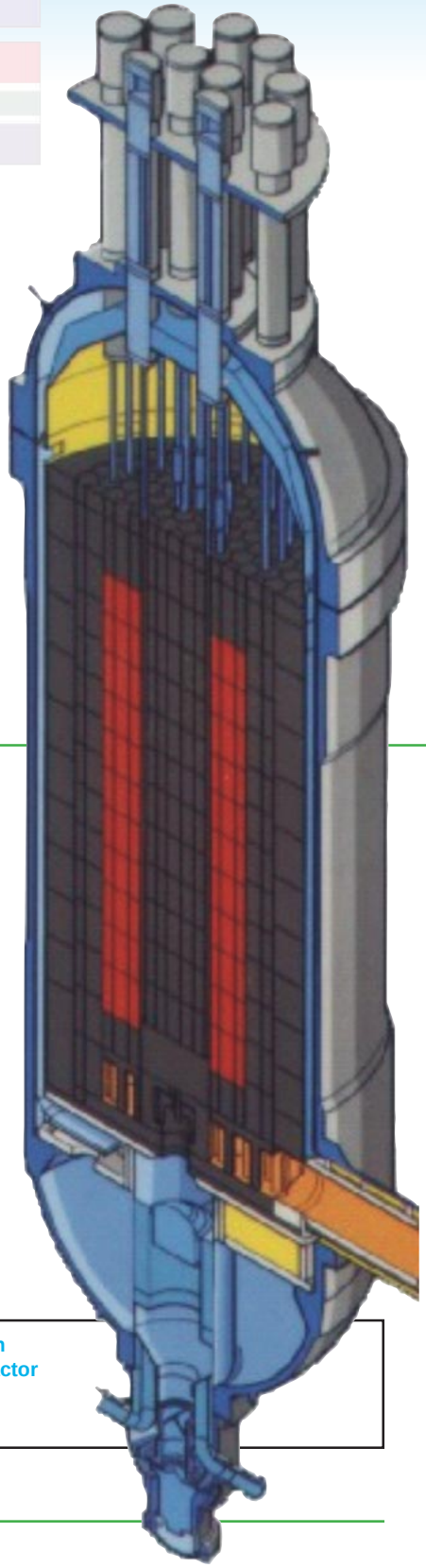

The Very High Temperature Reactor:

Leading the Next Generation of Nuclear Power Technologies

Advancing the Nuclear Hydrogen Initiative

The Idaho National Engineering and Environmental Laboratory is leading the U.S. research and development effort on an advanced generation of nuclear energy systems – known as "Generation IV" – that will:

- Meet surging energy demand around the world without increasing "greenhouse gas" emissions.
- Provide a better quality of life for billions of people around the world now living in poverty.
- Create a bridge to the hydrogen economy by allowing large-scale, emissions-free, economical production of hydrogen

A Global Effort to Create Tomorrow's Energy Systems

Ten countries – Argentina, Brazil, Canada, France, Japan, the Republic of Korea, South Africa, Switzerland, the United

Continued on back

In the VHTR, Graphite walls regulate the speed of nuclear fission reaction in the core. Helium is used to transfer heat from the reactor core to another area where it can serve an application, such as hydrogen production or electricity cogeneration.

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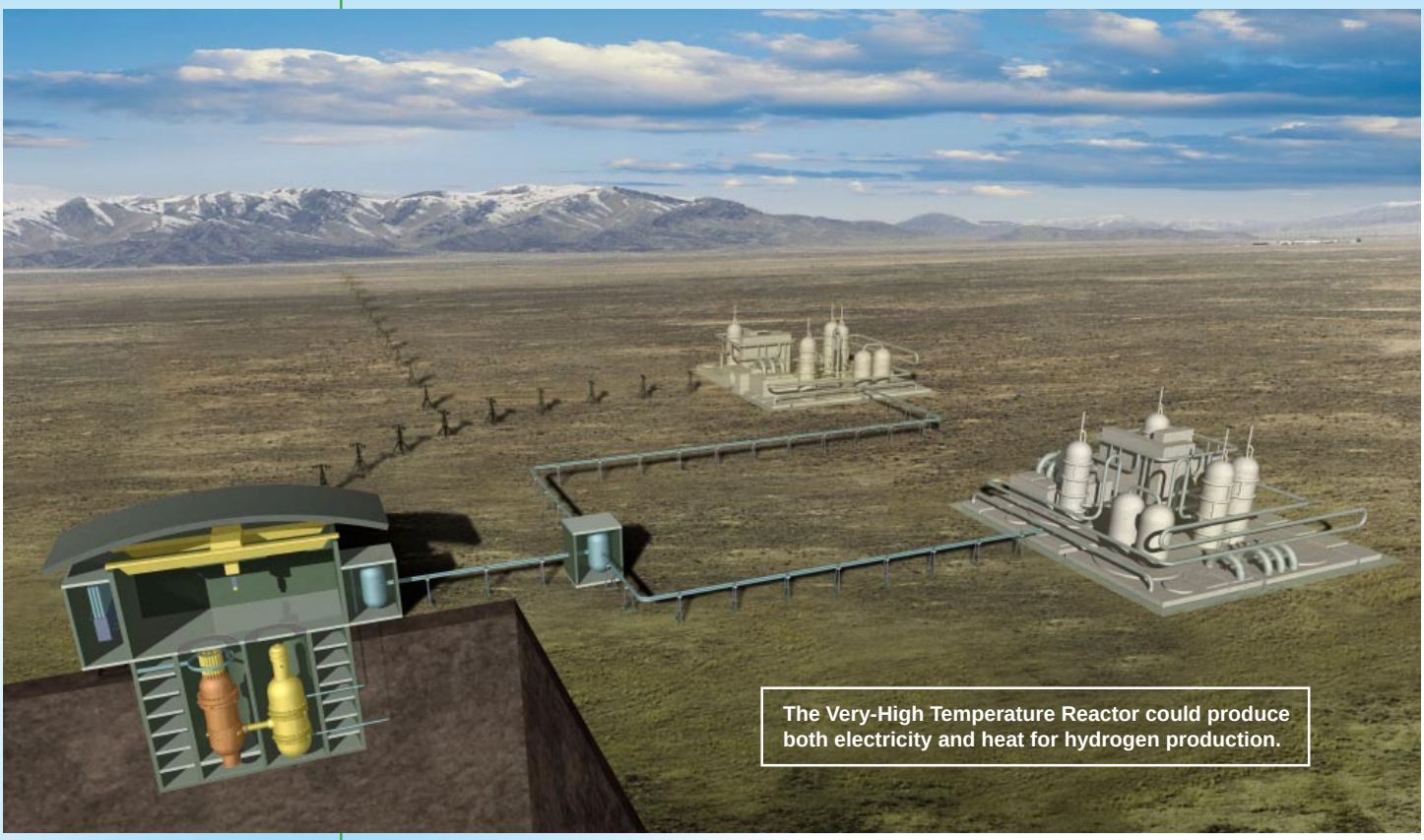

The Very-High Temperature Reactor could produce both electricity and heat for hydrogen production.

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Kingdom and the United States, along with Euratom – have created a framework for international cooperation in research to develop future-generation nuclear energy systems. These countries have formed the Generation IV International Forum (GIF) to develop a new generation of advanced systems.

Generation IV research in the United States is underway at the Idaho National Engineering and Environmental Laboratory.

The Very-High Temperature Reactor: A Generation IV Leader

The Very-High Temperature Reactor (VHTR) is among the most promising of the Generation IV technologies under consideration. It will specialize in production of hydrogen and other non-electricity applications.

The VHTR is gas cooled and operates at extremely high temperatures, with operational fuel temperatures above 1250 degrees Celsius. Graphite walls regulate the speed of nuclear fission reaction in the core, and the VHTR uses helium to transfer heat from the reactor core to another area where it can serve an application, such as hydrogen production or electricity cogeneration.

VHTR's Advantages

- An extremely high energy conversion rate – over 50 percent
- Suitability for thermochemical hydrogen production, seawater desalination and other high-temperature applications
- Fuel components that minimize the amount of waste produced
- Relatively quick deployment – possibly as early as 2020

It's Happening at INEEL

INEEL is leading the effort in the U.S. to make the VHTR a reality. A VHTR could be operating at INEEL around 2015, generating electricity and perhaps producing hydrogen as well using high-temperature electrolysis and/or thermochemical cycles.

The INEEL's Nuclear Energy organization provide the world-class leadership and technical backbone necessary to implement the VHTR and other new gas-cooled reactor technologies that will help assure the United States a continuing clean, efficient and stable energy supply. More than 800 additional engineers and scientists support this core of INEEL professionals with specialties covering all aspects of nuclear plant design, testing and operation.

For More Information

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The INEEL is one of the U.S. Department of Energy's multiprogram national laboratories, and is managed by Bechtel BWXT Idaho, LLC.

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